MOTOROLA

MC12022A
MC12022B

Consider MC12052A for New Designs

1.1GHz Dual Modulus Prescaler

MECL PLL COMPONENTS
÷64/65, ÷128/129
DUAL MODULUS PRESCALER

SEMICONDUCTOR
TECHNICAL DATA

The MC12022A can be used with CMOS synthesizers requiring positive edges to trigger internal counters such as Motorola's MC145XXX series in a PLL to provide tuning signals up to 1.1GHz in programmable frequency steps.

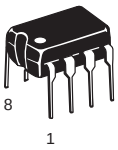
The MC12022B can be used with CMOS synthesizers requiring negative edges to trigger internal counters.

A Divide Ratio Control (SW) permits selection of a 64/65 or 128/129 divide ratio as desired.

The Modulus Control (MC) selects the proper divide number after SW has been biased to select the desired divide ratio.

- 1.1 GHz Toggle Frequency
- Supply Voltage of 4.5 to 5.5 V
- Low–Power 7.5 mA Typical
- Operating Temperature Range of –40 to +85°C
- Short Setup Time (t_{set}) 16ns Maximum @ 1.1 GHz
- Modulus Control Input Level Is Compatible With Standard CMOS and TTL. Maximum Input Voltage Should Be Limited to 6.5 Vdc

D SUFFIX
PLASTIC PACKAGE
CASE 751
(SO–8)



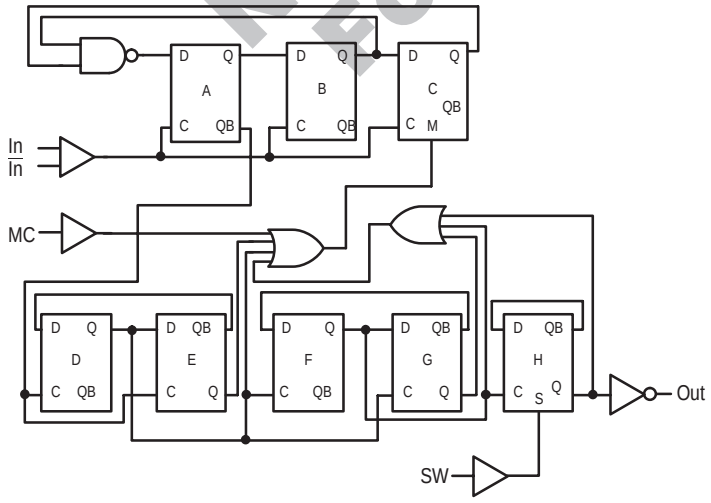
P SUFFIX
PLASTIC PACKAGE
CASE 626

FUNCTIONAL TABLE

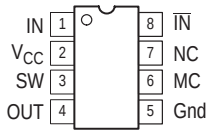
SW	MC	Divide Ratio
H	H	64
H	L	65
L	H	128
L	L	129

NOTES: 1. SW: H = V_{CC}, L = Open. A logic L can also be applied by grouunding this pin, but this is not recommended due to increased power soncumption.
2. MC: H = 2.0 V to V_{CC}, L = GND to 0.8 V.

Figure 1. Logic Diagram (MC12022A)



PIN CONNECTIONS



(Top View)

ORDERING INFORMATION

Device	Operating Temperature Range	Package
MC12022AD	T_A = – 40° to +85°C	SO–8
MC12022AP		Plastic
MC12022BD		SO–8
MC12022BP		Plastic

MAXIMUM RATINGS

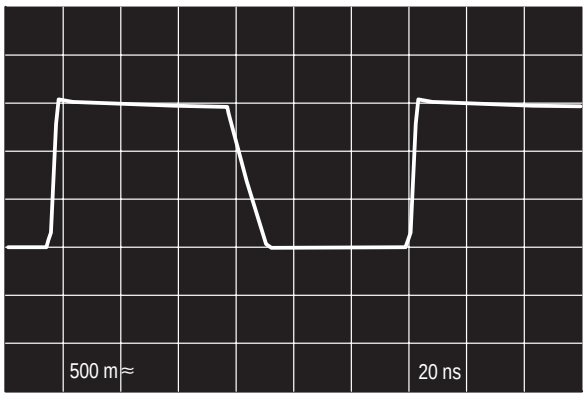
Rating	Symbol	Value	Unit
Power Supply Voltage, Pin 2	V_{CC}	–0.5 to + 7.0	Vdc
Operating Temperature Range	T_A	–40 to +85	°C
Storage Temperature Range	T_{stg}	–65 to +150	°C

NOTE; ESD data available upon request.

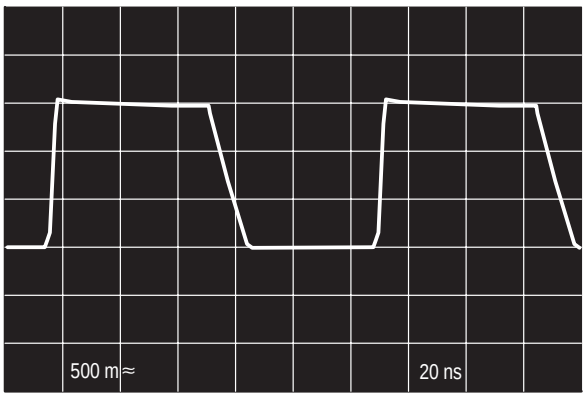
ELECTRICAL CHARACTERISTICS (V_{CC} = 4.5 to 5.5 V; T_A = –40°C to 85°C, unless otherwise noted.)

Characteristic	Symbol	Min	Typ	Max	Unit
Toggle Frequency (Sine Wave Input)	f_t	0.1	1.6	1.1	GHz
Supply Current Output Unloaded (Pin 2)	I_{CC}	–	7.5	10	mA
Modulus Control Input High (MC)	V_{IH1}	2.0	–	V_{CC}	V
Modulus Control Input Low (MC)	V_{IL1}	–	–	0.8	V
Divide Ratio Control Input High (SW)	V_{IH2}	V_{CC}	V_{CC}	V_{CC}	Vdc
Divide Ratio Control Input Low (SW)	V_{IL2}	Open	Open	Open	–
Output Voltage Swing (C_L = 12 pF; R_L = 2.2 kΩ)	V_{out}	1.0	1.6	–	V_{pp}
Modulus Setup Time MC to Out	t_{set}	–	11	16	ns
Input Voltage Sensitivity 250–1100 MHz 100–250 MHz	V_{in}	100 400	– –	1500 1500	mVpp
Output Current (C_L = 12 pF; R_L = 2.2 kΩ)	I_O	–	1.5	4.0	mA

Figure 2. Typical Output Waveforms

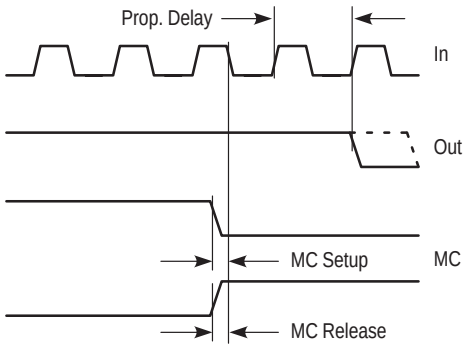


(÷64, 500MHz Input Frequency, V_{CC} = 5.0V, T_A = 25°C, Output Loaded)



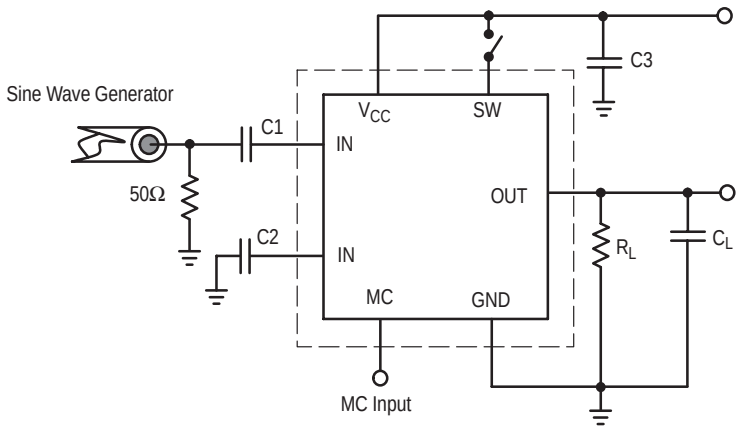
(÷128, 1.1GHz Input Frequency, V_{CC} = 5.0V, T_A = 25°C, Output Loaded)

Figure 3. Modulus Setup Time



Modulus setup time MC to out is the MC setup or MC release plus the prop delay.

Figure 4. AC Test Circuit



EXTERNAL COMPONETS
C1 = C2 = 1000 pF
C3 = 0.1 μF
C_L = 12 pF (Including Scope and jig capacitance)
R_L = 2.2 kΩ

Figure 5. Input Signal Amplitude versus Input Frequency

Divide Ratio = 8; V_{CC} = 5.0V; T_A = 25°C

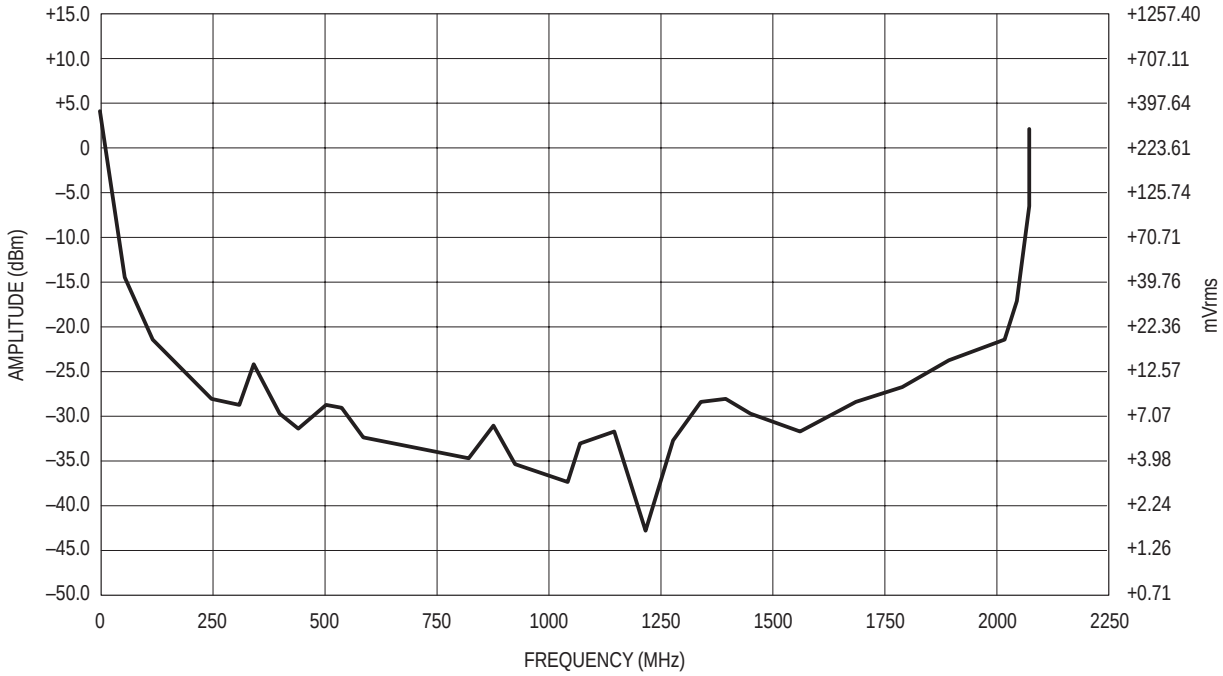


Figure 6. Output Amplitude versus Input Frequency

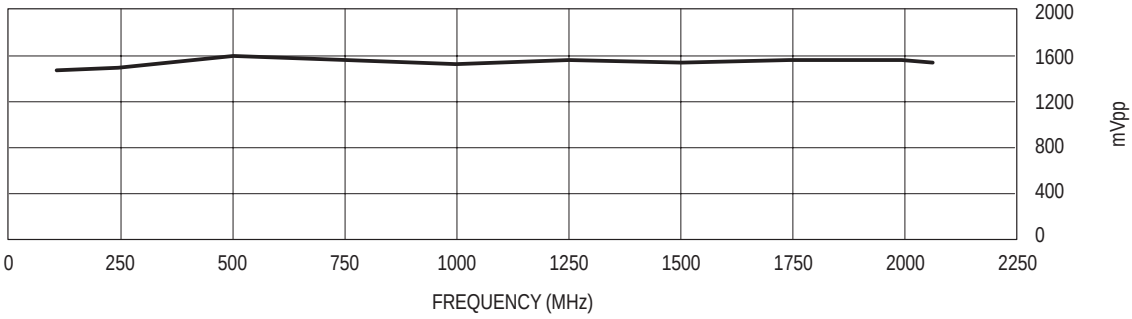
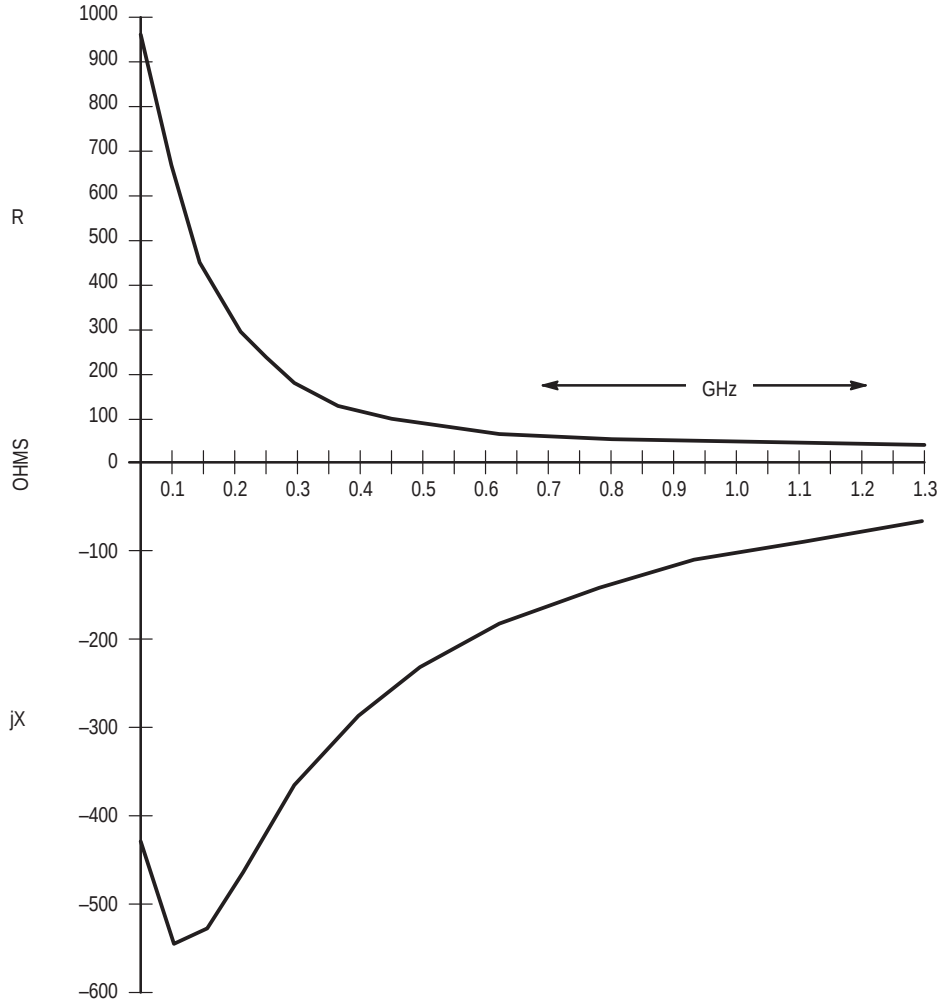
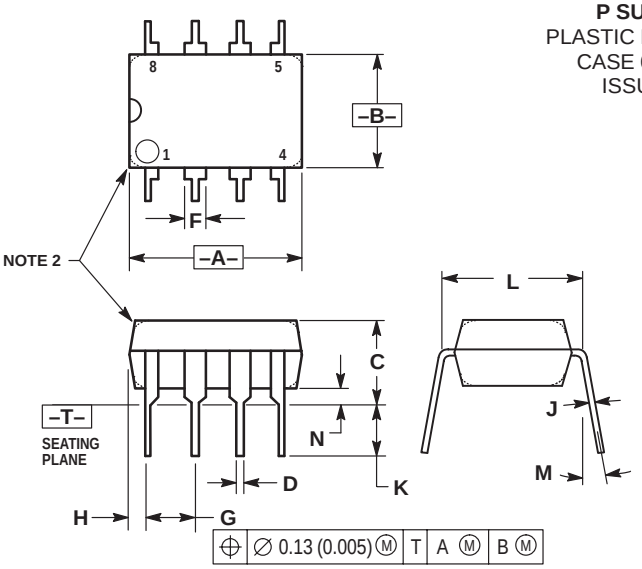


Figure 7. Typical Input Impedance versus Input Frequency



OUTLINE DIMENSIONS

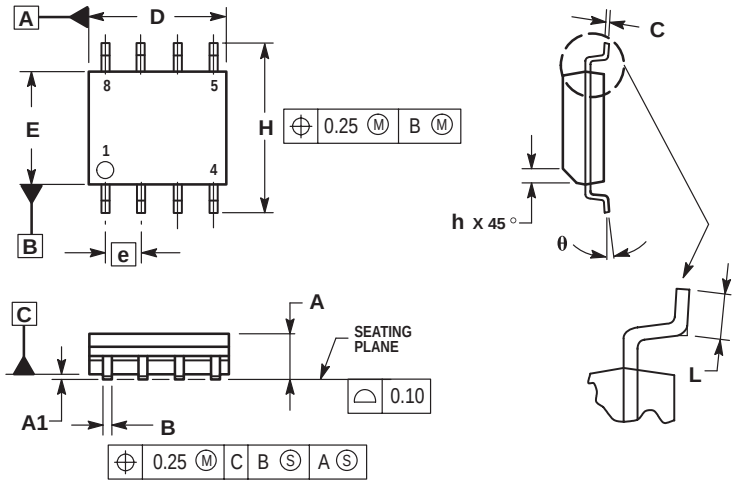
P SUFFIX
PLASTIC PACKAGE
CASE 626–05
ISSUE K



NOTES:
1. DIMENSION L TO CENTER OF LEAD WHEN FORMED PARALLEL.
2. PACKAGE CONTOUR OPTIONAL (ROUND OR SQUARE CORNERS).
3. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.

	MILLIMETERS		INCHES	
DIM	MIN	MAX	MIN	MAX
A	9.40	10.16	0.370	0.400
B	6.10	6.60	0.240	0.260
C	3.94	4.45	0.155	0.175
D	0.38	0.51	0.015	0.020
F	1.02	1.78	0.040	0.070
G	2.54 BSC		0.100 BSC	
H	0.76	1.27	0.030	0.050
J	0.20	0.30	0.008	0.012
K	2.92	3.43	0.115	0.135
L	7.62 BSC		0.300 BSC	
M	—	10°	—	10°
N	0.76	1.01	0.030	0.040

D SUFFIX
PLASTIC SOIC PACKAGE
CASE 751–06
(SO–8)
ISSUE T



NOTES:
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. DIMENSIONS ARE IN MILLIMETER.
3. DIMENSION D AND E DO NOT INCLUDE MOLD PROTRUSION.
4. MAXIMUM MOLD PROTRUSION 0.15 PER SIDE.
5. DIMENSION B DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL BE 0.127 TOTAL IN EXCESS OF THE B DIMENSION AT MAXIMUM MATERIAL CONDITION.

	MILLIMETERS	
DIM	MIN	MAX
A	1.35	1.75
A1	0.10	0.25
B	0.35	0.49
C	0.19	0.25
D	4.80	5.00
E	3.80	4.00
e	1.27 BSC	
H	5.80	6.20
h	0.25	0.50
L	0.40	1.25
θ	0°	7°

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